The Soybean Digest

IN THIS ISSUE

The CCC Purchase Program 1
What About Green Beans? 1
The Meal Situation 1
Market Problems Acute 2
Soybean Products in Food Manufacture 4
Suggested Rations with Bean Meal . . 6
Clearance Sale on Protein Meals . . 7
Soybread, Enriched with Minerals and Vitamins 8
Market Summary 12

Official Publication

OF

THE AMERICAN SOYBEAN ASSOCIATION

VOLUME 3 • NUMBER 1 NOVEMBER • 1942

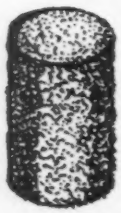
SB205
.S7A18

WHATEVER THE WEATHER

Staley's

SOYBEAN OIL MEAL PELLETS

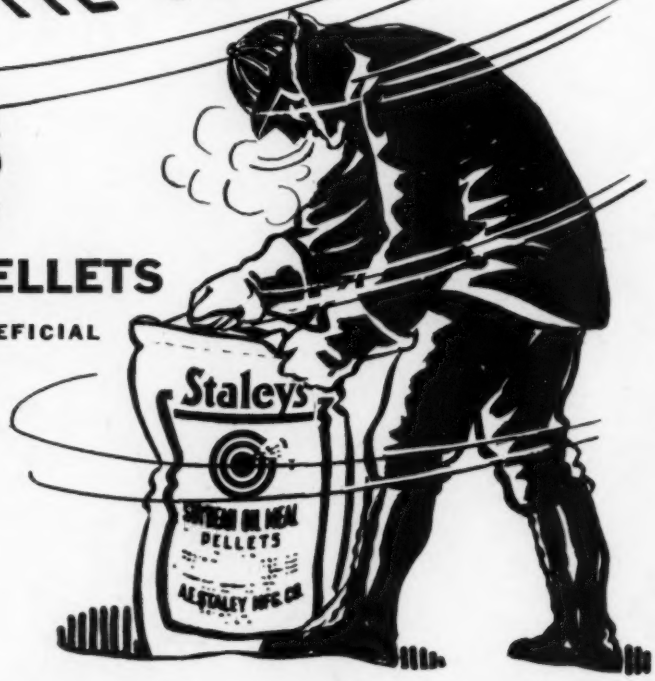
ARE EASY TO USE... ECONOMICAL... BENEFICIAL



Most good ideas come from those who need a new product.

A western rancher had used our Soybean Oil Meal for all his livestock, from the time we first manufactured it. But when winds began to whistle in wintertime, there was a new problem. Feed was scarce. The cold was cruel. If animals couldn't get their feed, or couldn't find it on the range, they suffered, and failed to grow.

So we made our pellets according to a formula suggested by him and other leading ranchers, who finally tested and approved them. Now they are available to all.



A. E. STALEY MANUFACTURING COMPANY

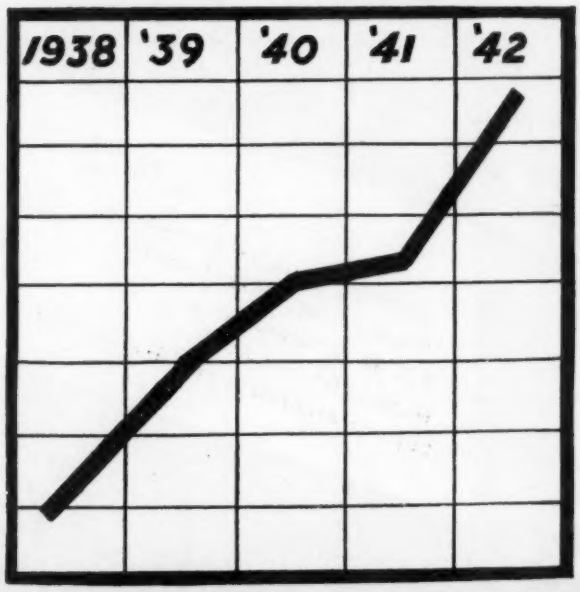
DECATUR (FEED DIVISION) ILLINOIS

Again

NOD-O-GEN Proudly Presents

Its Sales Record

The sales of NOD-O-GEN for inoculating Soy Beans have steadily grown for many years — before 1937 and since. As indicated by the chart, the growth during the past five years has been spectacular. Such a record could be made only by giving a high order of satisfaction to growers and dealers.



Farm Laboratory Division

THE ALBERT DICKINSON CO.

Chicago, Ill. Est. 1854

NOD-O-GEN

The Pre-Tested Inoculator
The Crop and Profit "Pepper Upper"

PUBL
JUN 18 1943
The LIBRARY OF AGRICULTURE

THE *Soybean Digest*

GEO. M. STRAYER, Editor KENT PELLETT, Managing Editor
Publishers' Representatives: Ewing-Hutchinson Co., Chicago

Vol. 3 NOVEMBER ☆ 1942 No. 1

Published on the 15th of each month at Hudson, Iowa, by the American Soybean Association. Entered as second class matter November 20, 1940, at the postoffice at Hudson, Iowa, under the Act of March 3, 1879. Forms close on 10th of month. Subscription price to association members, $1.00 per year; to non-members, $1.50 per year.

EDITORIAL

THE CCC PURCHASE PROGRAM

THE Commodity Credit Corporation, through its purchase program, did much to stimulate the soybean industry when it guaranteed $1.60 per bushel to the soybean grower. Last spring's announcement came at a time when acreage plans were being made. Soybean acreage figures jumped sky-high. America's edible oil supply was assured.

Mother Nature was generous during summer months. The highest yield in history was in prospect.

But no announcement was forthcoming on the CCC Purchase Program!! Growers began to wonder if they were going to get their $1.60. Grain handlers wondered how they were to be affected. Soybean processors knew not what to do about 1942 plans. The industry was in a state of indecision. The biggest soybean crop in history was on the way, and still no CCC announcements. The crop matured. Dry weather prevailed. Beans were harvested — and began to move. Still no official CCC announcements.

Processor contracts were announced at least a month later than should have been. Confusion resulted.

Elevator contracts were not available when the bean harvest was in full swing. They should have been ready a month sooner.

When the big freeze came the decision of CCC to buy beans below No. 4 grade, on frozen damage, was announced in about two weeks. But the grain dealer and the processor were not notified of their part in the program. Beans continued to flow as before, because there were no revised instructions available. Too much time was wasted in governmental red tape. Too many beans moved before CCC men moved.

We still believe the price guarantee was a good thing, even though it dislocated practically every segment of the industry. But, on future programs, we do suggest to CCC officials that:

1. Announcements of purchase plans be made well in advance, rather than too late. Governmental procrastination has no place in a war-time program.
2. The handler of beans be allowed a margin wide enough to pay his costs, narrow enough to rule out unreasonable profit-taking. The 1942 program does not allow such a margin.
3. Farmers be informed of the necessity of farm storage earlier in the season.
4. Materials necessary for construction of farm storage be allocated early enough to allow construction.
5. Farmers be discouraged trying to store beans in improvised bins, driveways and other places inadequate for so valuable a crop.
6. An orderly system of marketing be determined providing for disposal of distress beans, for renters, and giving equal opportunity to all growers.
7. Local AAA committees be furnished with more information (and more timely) on what is expected of them.

—s b d—

WHAT ABOUT GREEN BEANS?

THE September freezes in the northern part of the soybean belt caused considerable uneasiness to the trade, since there has been much uncertainty concerning the effect the freezes may have had on the oil and the protein content of the beans.

The final story has not yet been told, but results so far received have been encouraging. Tests run by various laboratories indicate that this year's green beans do not differ materially from the immature beans of the 1939 season, which had a normal composition.

In tests run on 90 samples of soybeans received from approximately 40 Iowa counties, Dr. L. K. Arnold, Research Associate Professor in Chemical Engineering at Iowa State College, failed to establish any correlation between damage count and oil count. Quoting Dr. Arnold: "With the exception of a sample of McClave beans, which are known to be low oil yielders, none of the samples contained less than 19.0 percent oil on the dry basis indicating that the early freeze did not appreciably lower the oil content. The appearance of the samples gave no consistent indication of the oil content, poor appearing beans analyzing as high in oil as fine appearing ones. In fact, one of the poorest samples apparently secured by picking out the damaged and immature beans . . . gave the high yield of 23.8 percent oil on the dry basis."

W. H. Eastman, vice-president of Archer-Daniels-Midland Company, Minneapolis, says the oil yield is better than average. "The color of the oil is naturally green," reports Mr. Eastman, "but otherwise the quality is excellent. So far we have not received a single objection from the trade to this green cast in the oil."

Mr. Eastman believes that in spite of the freezes this may be a record year for high protein content in soybean oil meal, though "very little is as yet known about the quality of the protein."

Though incomplete, all this is cheering news.

—s b d—

THE MEAL SITUATION

TWO months ago there were many predictions that soybean oilmeal would be available in such quantities as to glut the market. A 100 percent increase was destined, in the minds of some, to send soybean oilmeal into fertilizers, and to bring prices far below anything proportionate to other similar products.

Such calculations, it is now known, did not take into consideration the increased number of livestock units being fed on farms, the marked increase in the feeding of balanced rations, the higher percentage of proteins being fed when proteins are relatively cheaply priced, the shortages of animal protein products, the shortage of shipping space for Argentine flax, and the consequent decrease in linseed meal availability.

Soybean oilmeal, at the prices established at mills by the Commodity Credit Corporation purchase program, is

(Continued on page 3)

MARKET PROBLEMS ACUTE

NATIONAL soybean production estimate November 1 was revised upward to 209,953,000 bushels from 200,701,000 as of October 1, by the U. S. Department of Agriculture, closely approaching the September estimate of 211 million bushels made before the unseasonable September freezes in the North. Apparently the damaging effect of the freezes has been somewhat discounted, while areas which escaped damage are turning in even higher yields than anticipated.

In most areas fall weather has been favorable to harvesting which was nearing completion early in November.

Storage and marketing problems remain acute, with farmers expressing dissatisfaction at the slowness of market movements. In many sections farmers now seem to be unable to obtain soybean oil meal. But in others, correspondents report the need for more educational work in feeding meal.

ILLINOIS

J. C. Hackleman, Professor, Crops Extension, Urbana, for central and northern: 90 percent crop harvested Nov. 1, with 5 to 10 percent damage by September frost in central and up to 50 percent in north. Yield probably 10 percent under normal in northern Illinois, and probably 1½ bushels under earlier estimates for state. Storage situation spotted, some areas very short of space. Processors moving beans from areas of lowest freight rates. Permit system apparently not correcting it. Most farmers disappointed with government marketing program. Where farmers given rawest deals will be very slow to cooperate again. Farmers feeding all soybean oil meal can get. No more educational work needed until can be assured price to farmer in line with mill price as well as other competing meals.

J. E. Johnson, Champaign, for east central: 85 percent harvested Nov. 1. 10 percent actual discount damage by frost. 95 percent will grade No. 2. Yield about average for past four years. Storage situation satisfactory. Only one railroad had difficulty getting permits. Plenty of cars, good weather, and beans shipped out except for small amount on farms and elevators. Farmers know 1943 demand will be for acreage equal to 1942. Will not complain even though cards stacked against them as to markets. Farmers not feeding as much soybean oil meal as should. Covering a territory 50 miles each direction from Champaign, find soybean yields have disappointed growers and grain men. They had yields overestimated. Good weather and fine ground conditions with plenty of combines made harvesting move off very satisfactorily. More damage from weeds. Good seed demand starting even at this early date. Not enough attention given to good quality seed beans. Find beans grown on rock phosphated land preferable.

Russell S. Davis, Clayton, for western: 85 percent harvested Nov. 1. Frost damage 10 percent in quality, 5 percent in yield. 10 percent sample grade. Yield 95 percent of earlier estimates. Most of crop under roof, some still standing for want of storage. Most farmers not satisfied with grading as compared with last year, but no plans yet for 1943. Farmers anxious to sell beans and pay debts. Farmers not feeding soybean meal freely. Hog feeders buying commercial feeds. Cattle lots empty.

Frank S. Garwood & Sons, Stonington, Ill., for south central: 70-75 percent harvested Nov. 1. Frost damage serious to quality, particularly on late sown beans, yield 75 percent of normal. Elevators congested but so far able to handle crop. Farmers feel too much red tape in marketing program. Will plant earlier 1943, using earlier varieties and will probably be wrong. Farmers farm future as they think they should have farmed year just past: generally poor policy. This is first time in our history that have had serious damage from freeze to soybean crop. 1943 acreage probably about same. Farmers feeding bean meal freely, but very little educational work being done.

A. J. Surratt, Agricultural Statistician, Springfield: Estimate record crop of 73,487,000 bu. compared with 49,128 000 in 1941 and 19 million the 10-year average. Estimated yield per acre, 21.5 bu., about same as last year.

IOWA

R. C. Bentley, Extension Economist, Ames: 51 percent of 713 samples of beans received at Cedar Rapids by the Federal Grain Supervision office between Oct. 2 and 23 graded No. 4 or better on damage factor only. 38 percent showed 8 to 20 percent damage, balance over 20. Believe present Commodity discount schedule meeting with approval by farmers, though may lose some producers next year.

John Sand, Marcus, for northwest: 75 percent of crop harvested Nov. 1. Most beans 5 to 10 percent damage, but replanting or late beans considerably more. 15 percent sample grade, 50 percent No. 2. Storage very crowded, elevators hesitate to store present quality beans. Farmers feel goverment operating too slowly. Many will want to plant earlier beans next year.

Howard L. Roach, Plainfield: 60 percent harvested Nov. 1, 40 percent damaged by frost. 80 percent sample grade beans. 5 percent No 2. Processors should take green beans. Farmers feeling good toward government marketing program, but promotional work will have to be done to hold up 1943 soybean production. Believe we should do more educational work on soybean meal.

Agent U. S. D. A. Bureau Plant Industry, Ames: 60 percent crop harvested Nov. 1. Little or no damage to oil percentage; 10-15 percent decrease yield per acre. 5-10 percent will grade 30-100 percent frost damage. 45 percent sample grade. Farm storage crowded, but most critical other than farm storage. Farmers will have to use "makeshift" bins until processors can use beans. Farmers satisfied with price but definite rush to send beans to elevators. Some new growers pessimistic about planting beans 1943. Will need much urging and publicity. Many terminals or elevators report not running moisture tests, as moisture extremely low (before rainy weather Oct. 28-31). Reported processors attempting to process most severely damaged beans first. Only best, matured yellow (no green damaged beans) should be kept for seed. Farmers should have beans germinated before planting time.

INDIANA

Peter J. Lux, Agricultural Conservation Committee, Indianapolis: 70 percent harvested by Nov. 1, 11 percent damage by frost, 8 percent sample grade. Yield 45 percent above average, 25 percent above earlier estimates. Serious shortage of storage space. Flat storage space being leased by elevators and county AAA. Farmers appreciate support price, now realize part of beans must be stored on farm. Are willing to produce needed beans in 1943 if guaranteed support price. Educational work for oil meal being started by AAA and Purdue University.

K. E. Beeson, Extension Agronomist, Lafayette: Two-thirds crop harvested in northern counties more elsewhere in state Nov. 1. Very little damage by frost. Most deliveries grade No. 2. Yield above normal and higher than earlier estimates. Farmers forced to makeshift storage, chief concern now where to store remainder of crop. Heavy 1942 yields and good price both encourage big acreage 1943. Inability to sell beans and storage problems discourage interest in big 1943 acreages. Farmers reporting difficulty in obtaining soybean oil meal. Purdue University issuing new publication summarizing all recommendations on feeding meal.

Ersel Walley, Walley Agricultural Service, Fort Wayne, for northeastern Indiana and northwestern Ohio: 40 percent crop harvested Nov. 1. Relatively small frost damage. Yield reduced ¼ on 10 percent acreage, average 10 bu. above normal. 95 percent grade No. 3 or better. Storage situation critical. Shortage of available farm storage, much unsuitable for beans. Difficult to purchase lumber or secure carpenters. Most local elevators disgruntled with government program. No profit motive which justifies elevators in storing beans and taking chance on grade or spoilage. Farmers feel should be greater spread between present price and price of beans held until July 1943. If government had established price of $1.45 bu. to farmer for beans going to processor in October and November, $1.51 for December and 2c-3c bu. up for each month for 8 months, urge would have been created to arrange farm and elevator storage. Unusual yield will result in large plantings on poor lands which will destroy yields in normal year. Feeding of bean meal increasing but still too small.

J. B. Edmondson, Clayton, for central: 95 percent harvested Nov. 1. 5 percent frost damage to late plantings. Yield 8 bu. above normal, 5 over earlier estimates. All beans taken care of, but during peak harvesting, elevators refused for several days. Farmers feel secure and unworried about market. For 1943 larger acreage planned at possible expense of pasture and clover. More educational work on meal could be done with telling effect.

OHIO

G. G. McIlroy, Irwin, for central: 75 percent crop harvested by Nov. 1, 10-20 percent damage by frost, few sample grade. All market movement stopped. Apparently balance of crop may have to be held on farms. Farmers seem willing to duplicate 1942 effort next year if price maintained. Much yet to be learned relative to soybean yield. New and improved varieties must be found. Old Manchu certainly held its own in this territory this year.

D. F. Beard, extension agronomist, Columbus: 60-70 percent crop harvested in s. Ohio, 35-45 percent in n. Ohio Nov. 1. Yield severely reduced by frost in some cases — ½ bu. per acre state average. Mat of leaves in frosted beans insulates soil from drying winds, thereby slowing curing during backward season. 90 percent harvested for beans. Yield 3 bu. above normal state average. Enough storage space but some of doubtful quality. Many farmers will quit growing beans when or if price falls much from present level. "One acre of beans removes more phosphorus and potash than acre of corn," is argument.

Elmer F. Kruse, Agricultural Conservation Committee, Columbus: 80 percent harvested by Nov. 1. 10 percent frost damage

(Continued on page 10)

EDITORIAL

(Continued from page 1)

cheap feed. Livestock prices are highly favorable. Grain prices are high compared with soybean oilmeal at $40 retail. Feed mixers and manufacturers realized that. Future contracts on meal delivery got far ahead of production. Commercial channels started taking the entire output. Local feed dealers, not having contracted for their requirements, expected to pick up a few tons from day to day as needed. It was not available. Farmers, wanting to buy a few bags, found it unavailable. Soybean oil meal, under the CCC program, was such a good buy that supplies were snatched up far in advance. Too much of a good thing had created a shortage. The local dealer and the feeder could not buy it at all. The "Food for Victory" program, in the eyes of many, was being defeated because of the shortage of proteins. It was all going into mixed feeds. An anticipated heavy over-production was in reality a shortage.

In a time of national emergency it is desirable to have plentiful supplies of protein feeds available at reasonable prices. That was the thing in the back of the minds of growers, grain dealers, processors, and the governmental agencies concerned. It was not available at country points, except in mixed form.

Effective November 13 the Office of Price Administration issued an order establishing uniform margins for distributors of oil meals and cake. This order limits to 50 cents a ton the margin which a jobber may charge over what he pays the manufacturer. Wholesalers are restricted to a margin of $2 per ton on meal purchased from a jobber, and $2.50 per ton on meal purchased from the manufacturer. Retailers are held to $3 per ton on purchases from a wholesaler, $5 per ton on purchases from a jobber and $5.50 per ton on purchases direct from the manufacturer.

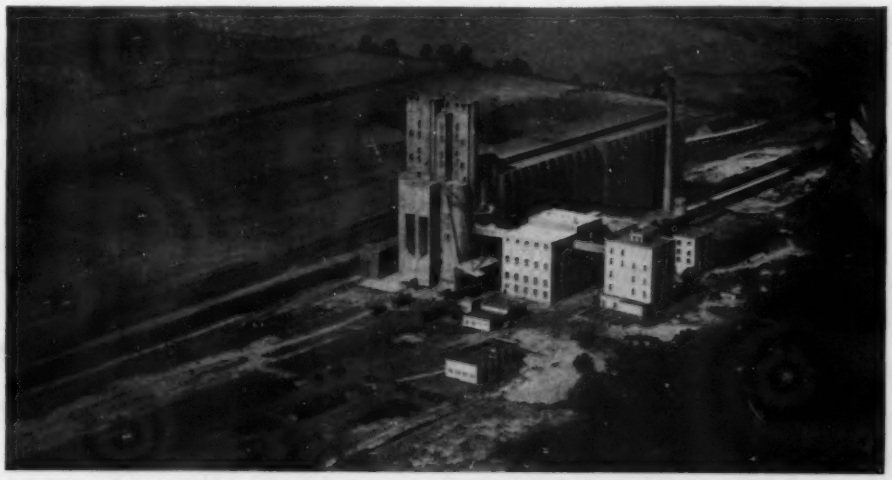
These restrictions are designed, according to OPA, to pass on to the farmer the savings made by the CCC in its processing contract with oil seed crushers, and to maintain customary margins between the crushers' prices and the wholesale and retail prices. No individual or concern can act in more than one capacity. It is hoped this may ease the supply situation.

But other steps are under way also. Cottonseed crushers in the southwest are being asked to crush soybeans. CCC officials have been meeting with cottonseed crushers during the past week. It is expected that a number of cottonseed plants will be converted to beans very shortly.

Flax milling operations are also being curtailed. They are being converted to beans. Mid-continent plants and seaboard plants, operating on both domestic and imported flax, have changed over to beans or will do so very shortly. Midwest beans are moving to the west coast for processing in the idle copra mills there.

Expectations had been that about 50 million bushels of the 1942 crop of 209 million would be held back as a reserve, unprocessed, at the end of the season. The demand for meal and the demand for oil have made it seem illogical to do so. If present plans of governmental agencies materialize it would seem that the entire crop will be processed before 1943 beans are available.

That would seem to require an even greater acreage of beans in 1943, in order to insure ourselves and our allies of adequate supplies of edible oil and high-protein feeds. Watch this possibility. 1943 figures are expected to be announced in December.



A. D. M. Soybean Processing Plant . . Located at Decatur, Illinois.

WHAT IS GOOD-WILL?

Good-Will is the disposition of a satisfied customer to return to the place where he has been well treated.

The Archer and Daniels families have been engaged in the Oil Milling business for a century (1840-1940), and the good-will which has been built up during those hundred years is jealously guarded in every transaction.

ARCHER-DANIELS-MIDLAND COMPANY

MINNEAPOLIS, MINN.

Other Soybean Processing Plants Strategically Located at:

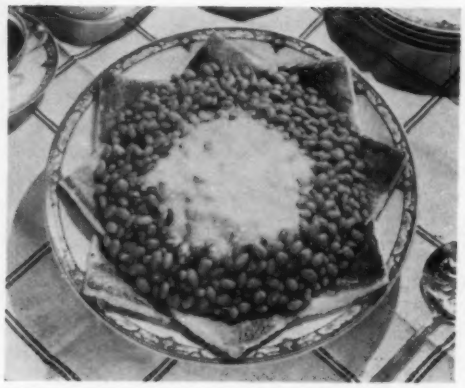
CHICAGO
TOLEDO
MILWAUKEE
MINNEAPOLIS
BUFFALO

The Mark of

ARCHER BRAND

Quality Soybean Products

Soybean Products in Food Manufacture



Foods must satisfy psychological as well as physiological hungers. Above, a pot pie; at right, soybean sandwich.

By A. A. LEVINSON
The Glidden Company, Soya Products Division, Chicago, Illinois

WHEN I was first asked to write on "The Use of Soybean Products in Food Manufacture," the thought that entered my mind was not how soya products are, or could be, used by the food manufacturing industry — but the difficulties that were encountered in trying to get a continued interest on the part of the food manufacturers, and particularly those who had tested the products just once — even though it were many years ago.

We in the Soya industry must admit that our knowledge, at this time, of how to use soya was extremely limited — and we should not have expected any better reception for our products.

If most of the people in this country were nutritionally trained, progress in the utilization of soya might have been so rapid that the soybean would then have rightfully been entitled to the term of "magic," "miracle," etc., that have been applied to it.

I use the phrase "might have been so rapid," rather than "would have been so rapid" as I feel that although we would have been well fed, from the standpoint of our protein requirements and the other factors that the soybean contains, as well as economically fed — we may have only been nutritionally, or physiologically, satisfied — because we might not have enjoyed eating our food and thus we would not have satisfied our "psychological" hunger.

The food manufacturers' problem, as well as the housewives,' is to prepare products that will satisfy both of the "hungers" mentioned above. If one were to attempt to set up a standard for a good food product, it is my belief that such a food would have to meet the following specifications. First, it must have eye appeal (that can be color, texture, and general appearance). Next, it must have a desirable odor and a desirable initial taste. Third, it must have a desirable, continuous flavor and desirable eating qualities (palatability). Last, there must be a pleasant after-taste and a sensation of complete satisfaction and fullness. The first three points take care of one's "psychological" hunger. The fourth takes care of both the "psychological" and the "physiological" hunger.

There are many factors to be considered in developing food products that will satisfy the psychological hunger of people, as each individual is swayed by his or her own peculiarities and tastes, their origin, and environment. I feel that it is much simpler to take care of their "physiological" hunger.

Although the above applies to manufacturers of finished food products, as well as to housewives, the food manufacturer must produce better appearing, better eating, and better tasting products than the housewife — in order that he may get equal reception for his products.

Producing good foods, containing soya, was not an insurmountable problem, as it will be shown that by intelligent work and cooperation between the soya and the food manufacturing industry, strides have been made and food products developed conforming to the above requirements.

A Little History

It may be of interest to briefly discuss the type of soya products that were first presented in this country, and the uses to which they were put. Among the first to be offered to the trade was a soybean flour, made by grinding whole soybeans. Naturally, such a flour was beany in taste and its use in even small amounts produced foods of a very undesirable flavor. This flour had a very short life for general food purposes, but became valuable years later as a bleaching agent for bread. The soybean, in its original form, contains enzymes which aid in whitening bread, by the destruction of the pigments in natural unbleached wheat flour. The amount needed to accomplish this action was exceedingly small and soybeans were used for a specific reason in no way related to its nutritional value. Following this there was offered to the trade a product that was called soybean flour, but which was actually no more than a sifted meal.

One could not detect a beany flavor in the flour but that was only because the product had such a highly roasted or burnt flavor that it couldn't be detected even if it were there. This flour had a moderately high percentage of hulls, was coarsely ground, and was quite dark in color.

This flour was first purchased by the health food stores, to be mixed in with other preparations, and was also sold direct to the consumer. Most of the people who purchased such products felt that anything containing soya was good for them — and they therefore consumed the food — I have to assume — with relish.

Others, however, had to eat the product because of some ailment, and as the soya flour referred to was really no worse than some of the other concoctions that they consumed, there was very little we could learn from them.

Progress

Food manufacturers and the public in general fortunately were not given much of an opportunity to accept or reject such products, as the manufacturers of soya now began to produce edible soya products — which were made by processes in no way related to the manufacture of meal. We began to hear of debittering, dehulling and in some cases degerminating. We heard of temperature control and how it related to the nutritional, as well as the physical, qualities, of the finished products. It appeared as if we were on the right road to the introduction of soya in finished foods. We had some bad flours before all of this — now we had some good ones. They were a full-fat flour and low-fat flours of the mechanical and extraction types. The full-fat flour, as the name denotes, contained all of the fat of the dehulled and processed bean. This product contained about 20 to 22% fat and from 39 to 41% protein. The low-fat flours, made by the mechanical process, had a large part of the oil removed and the finished flour had a fat content of approximately 7% and a protein content varying from 47 to 50%. The low-fat, or practically fat-free flour — as made by the extraction process, or the solvent process as it was then termed — contained about 1% fat and could, by controlling the process, contain any amount of fat desired. The protein content varied between 49 to 52%, depending on the amount of fat left in the product.

All of the above products had a fibre content below 3% which meant that about 95% of the hulls had been removed in the processing. The other factors, such as ash, nitrogen free extract, etc., increased or decreased in relation to the amount of fat removed in the processing. All of the soya flours had a neutral to mild flavor, a white to creamy color — depending on the product and the method of manufacture.

Baking Industry

In attempting to find fields in which these flours could be used, it was natural for the industry to contact the baking industry. After all, we had a good flour and the bakers used flour. We knew that soya flour did not contain starch, but it had protein and fat and both of these products were contained and used in bread. We also knew that the protein of the soybean was not glutinaceous, as wheat was, but milk was used in bread and the protein of milk was not glutinaceous.

I wish I could say that acceptance of these improved soya flours as a bread ingredient was instantaneous, but that was not so. Whereas the failures in the use of soya previously were due to the quality of the products — our knowledge of how to properly use our improved soya products was far from what it should have been, and the failures continued to haunt us.

The industry began to take stock of itself and realized that "by guess and by golly" methods had to go, or the use of soya in food would be set back a good many years.

It was not enough to say — "Here is an excellent protein food product, just use it in everything."

Soya Properties

They began to study the soybean and from this study began to learn how the product should be used. We knew that soybeans contained enzymes, one of them the bleaching enzyme previously mentioned. There were others, of the diastatic, proteolytic, and lipolytic groups — or as they are commonly termed, the starch, protein and fat splitting types. We learned how to use these enzymes, if we needed them, and how to destroy them if we did not want to use them. We learned that the sugar content of soybeans was fairly large so that for many products this had to be taken into consideration, as it might affect fermentation in bread, cure in sausage products, and general taste in all foods. We found that the proteins in soya have excellent absorption properties, with reference to either moisture or fat or both, and acted as a good emulsifier. We began to feel that soya protein was a flexible protein in that it could, by proper handling and manipulation, be blended with other proteins — without greatly changing the physical properties of the protein to which it was added. We found that although soya did not contain starch — yet the action of the soya protein and pentosang was such that in many cases it appeared to resemble starch.

We now had the basic knowledge to go with good soya products. Progress from this point was not spectacular, but consistent.

Soya flour, particularly the full-fat type, at first, and other types later, began to be used in bread consumed by other than those who frequent health food stores. Percentages used were from 15 to 25%. In making such percentages in bread, the fermentation time had to be carefully controlled. Baking time was slightly lengthened by some of the bakers and the baking temperature was slightly raised by others. In some cases, wheat flour with a higher gluten power was used as it compensated for the "load," as some called it, that soya flour put on the bread. It is true that this loaf was still a specialty loaf, because of the price at which it was sold, and the fact that it still fell short of our understanding of a good food — as outlined previously in this paper.

Cream Color

It was as good a bread as other specialty breads, and in some cases far better — but such a bread still catered to the 2% of the population that consumed specialty bread, rather than the 98% that bought white bread of larger loaf volume. Soya bread had many fine qualities. The crust color was excellent. Toast prepared from such bread was nutty in flavor and had a fine eating quality. It stayed fresher than ordinary bread. The loaf volume was not as great, and the loaf naturally was more compact. The color was a cream shade — objectionable to some, at that time, but considered by many today as more desirable than a white color.

We were approaching and beginning to overcome the psychological factors that prevented people from buying soya bread. From the standpoint of the food manufacturer, however, I believe that percentages of from 4 to 6% in bread would be much more desirable as loaves of bread will be produced that will equal our present white bread in all of its good qualities, and in addition, will add to it the desirable factors mentioned, when soya is used. In this way we would not have a difficult time overcoming the prejudices of the American public.

It is felt by many in the industry who have conducted nutritional tests that the addition of this moderate percentage of soya flour to bread will make a complete protein of the protein in the bread, and still increase the total protein from 10 to 13%. Of this total protein, approximately 15% would be represented by the soya protein. As to whether or not, in the case of bread, it is better to consider making the protein a complete protein rather than have the bread a carrier of large amounts of protein — I will leave for the nutritionists to answer.

Sweet Goods

In sweet goods, basic sweet doughs, doughnuts and cakes, from 3 to 5% of soya flour, based on the weight of wheat flour, is commercially used. This addition definitely improves the crust color of the baked products — producing an even brown color. The texture and color of the crumb are good, the eating qualities are excellent and the product stays fresher than one without soya.

Very little change in baking practice was necessary to accomplish this. Here is a case of successful adaptation of soya in a food product, not because it was thought that soya was a good product nutritionally — but because it aided in the production of a food that people liked.

Simultaneously with the introduction of soya to the baking industry, intensive efforts were undertaken to have soya products used by the meat-packing industry — in ground meat products such as sausages and meat loaves. The producers of such meat food products have for some time used cereals, milk, and vegetable flours as binding agents. The purpose of such binders was to retain the juices during processing. Soya products served as well, and in many cases much better, than the other binders mentioned. Since soya was a protein product, its action during smoking, cooking and baking was similar to meat, and difficulties in its use were encountered as the types of binders previously used acted in a different manner. For example — cereal products would gelatinize and swell at temperatures of 155 to 160 degrees Fahrenheit, whereas soya began to coagulate and as the temperatures of processing increased coagulation or denaturization continued with the resultant release of some moisture. Manufacturers of meat food products slightly changed their method of manufacture, and easily overcame what at first appeared to be a serious problem.

As Sausage

Soya, when used in sausage, produced a firm product — but one that still had the natural resiliency and eating quality of a good meat food product.

Soya, when used in meat food products, can produce two types of foods. First, a food of much higher protein that regular meat food products, at a comparable cost, and second, it can be used as an extender, producing foods of equal protein content at a much lower cost than the original meat food product.

Today it is quite important, because of the high price of meat and possible shortages, to attempt to extend meat food products by the use of soya. It has been shown that in a product containing 87.5% pork and 12.5% soya that the yield of finished food, after processing, whether the food be processed in cans or fried, is from 25 to 40% greater than the yield of an all pork product. This means that part of the juices and fat that are released from the regular pork product during processing will be held in the meat food product by the soya. 30-35% of the protein in the pork and sova sausage will be soya protein when 10-12½% of soy is added to the pork. The finished edible portion of the product will, upon chemical analysis be equal in protein and fat

(Continued on page 11)

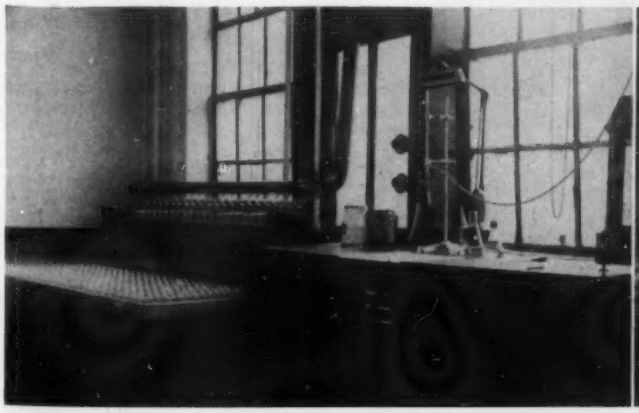
* * * *

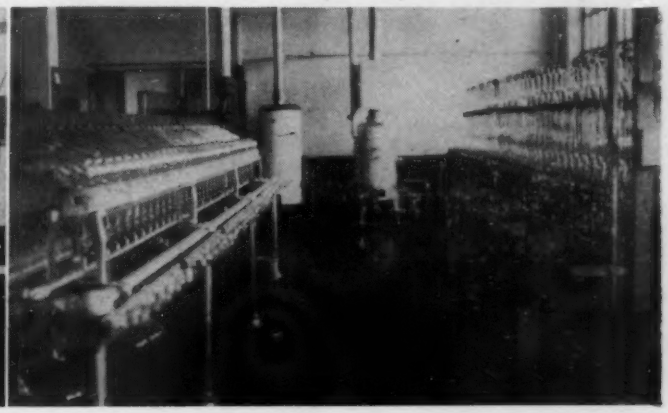
Woodson-Tenent Quarters

Below are two interior views of the spacious new home at 265 South Front Street, Memphis, Tenn., of the Woodson-Tenent Laboratories.

The efficiently planned laboratory of these analytical and consulting chemists covers 6,000 square feet and is the culmination of the ideas of the owners, P. W. Woodson and E. H. Tenent, backed by 25 years of analytical experience.

The firm was organized in 1934 in a small laboratory at 177 South Front Street, Memphis, and they have expanded each year until they now have their own building and a personnel of 25 employees. They also have established a branch laboratory at Cairo, Ill. Views below are of the fatty acids (left) and protein departments.





Some Suggested

RATIONS WITH BEAN MEAL

WITH wartime adjustments in livestock and poultry rations, feeders and dealers are asking for new formulas. In some instances, feeders are unable to obtain animal proteins in any form.

The following suggested rations and supplements are by nutritional authorities and may be of help to our readers.

Hog Rations

C. M. Vestal of the Department of Animal Husbandry, Purdue University, recommends the following use of soybean oil meal in mixed supplements for hogs.

For growing and fattening hogs on pasture:

Supplement C

Meat and bone scraps	20 lbs.
Fish meal	20 "
Soybean oil meal	40 "
Cottonseed meal	10 "
Linseed oil meal	10 "

Supplement A

Meat and bone scraps	50 lbs.
Soybean oil meal	50 "

For growing and fattening hogs in dry lot:

Supplement 5

Meat and bone scraps	20 lbs.
Fish meal	20 "
Soybean oil meal	40 "
Cottonseed meal	10 "
Alfalfa leaf meal	10 "

Supplement 2

Meat and bone scraps	40 "
Soybean oil meal	50 "
Alfalfa leaf meal	10 "

Tankage can be substituted for the meat and bone scraps in these mixtures. If fish meal is not available for use in Supplements C and 5 use Supplements A and 2 instead. If tankage and meat and bone scraps are scarce and comparatively high in price use less of these feeds and more soybean oil meal in the simple mixtures.

For Poultry

Dr. D. C. Kennard, in charge of poultry investigations, Ohio Agricultural Experiment Station recommends the following *emergency* mash mixtures without milk, meat or fish by-products for laying hens. Dr. Kennard emphasizes that these mixtures are recommended for use only "when the poultryman or feed merchant cannot obtain animal products which should be used to supplement soybean oil meal for best results."

	No. 1	*No. 2*
Yellow corn, coarsely ground	37	17
Wheat middlings	15	15
Wheat bran	10	10
Soybean oil meal	25	40
Alfalfa leaf meal (dehydrated)	8	10
Bone meal (special steamed)	2	4
Salt	1	1
Oyster shells (chick size)	2	3
Vitamin D feeding oil (400 AOAC)	0.5	0.7

Formula No 1 is a 19 percent protein mash which may be used as a chick starter, or as a laying ration to be supplemented with about an equal amount of whole grain.

Formula No. 2, a 24 percent protein mash, is preferable for feeding layers with the free choice of whole corn and whole oats. The mash, prepared from either of these formulas, cannot be expected to give as satisfactory results as if they contained fish meal or meat scraps and milk products, especially for the production of hatching eggs.

A sudden change of feed when layers are in a high rate of production may, in itself, cause a loss of eggs (and layers, too) even if the new feed is as good or better than the old. Should it be necessary to make a change, it should, if possible, be made gradually over a period of 2 to 3 weeks' time.

The following laying mash is recommended by Iowa State Experiment Station:

Alfalfa meal (17%+ prot. & br. green)	130
Meat and bone meal	70
Dried milk	30
Soybean oil meal	160
Gr. o. shell, clam shell or limesone	40
Steamed bone meal	50
Fine salt	20
Manganese sulphate (oz.)	4
Fish liver oil	20

Omit dried milk when ¼ of the drink is liquid milk. When both water and milk are given all day omit the dried milk, ½ of the meat and bone meal and ½ of the soybean oil meal. Mix 1 or 2 weeks supply at a time to avoid loss of vitamins.

For Dairy Cattle

The following recommendations for feeding dairy cows are by C. Y. Cannon, head of the Dairy Cattle Husbandry Department, Iowa State College:

Good legume hay and if possible silage makes the best roughage foundation for a superior dairy ration.

This kind of roughage should be supplemented with a grain mixture containing 13-15 percent of total protein (10-12% dig. prot.). The following mixture is satisfactory.

Corn or wheat	400 lbs.
Oats	400 lbs.
Soybean oil meal	100 lbs.

Roughages poorer in protein than the leg-

"FEED MORE PROTEIN"

★ FEE

Up Proteinp

By REX BERESFORD

Extension Animal Husbandman
Iowa State College

THE livestock producer who is looking for a way to lower his feed costs and conserve on badly needed corn supplies should give careful consideration to the possibility of increasing the amount of protein supplement in his present hog and cattle rations.

Increasing the amount of protein fed to both cattle and hogs under present prices of soybean meal would be a profitable step in most feedlots.

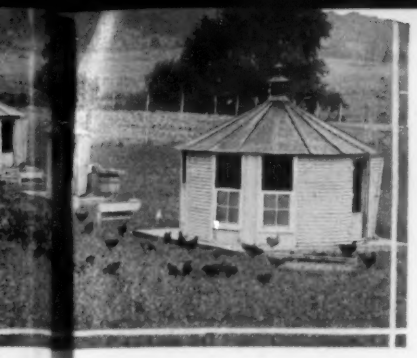
Soybean meal is an especially good buy in most communities and is an ideal supplement except that it requires the addition of more minerals than when tankage is fed.

Price

Ordinarily the price of protein supplement is about 50 percent more than the cost of the grain. Consequently, the amount fed must be limited because corn is more economical.

However, when protein feeds become relatively cheap it pays to step up the amount fed. Experiments indicate that gains not only will be rapid, but will be made more economically.

— Courtesy Iowa Farm Economist



EING ★

umes such as mixed timothy and clover should be supplemented by a grain mixture containing 17-20 percent total protein (14-16% dig. prot.). Such a grain mixture can be made up of

Corn or wheat	400 lbs.
Oats	400 lbs.
Soybean oil meal	300 lbs.

When only grass hays such as timothy, sudan grass, oat hay, or corn fodder are being fed the grain supplement should carry 19-21 percent total protein (16-18% dig. protein) which may be made from a mixture of

Corn or wheat	400 lbs.
Oats	400 lbs.
Soybean oil meal	400 lbs.

In any of the above rations an equal weight of corn, corn and cob meal, wheat or barley may replace each other with about the same results in milk yield. Likewise oats may be replaced by an equal weight of bran.

Dairy cows may be thrown "off-feed" by sudden changes in the quality and kind of grain mixture fed them. For that reason, careful dairymen make grain changes rather slowly, especially if their cows are being heavily fed.

...eiupplement

Some of the most recent experiments on the amounts of protein supplement which can be used to balance beef cattle rations most profitably were conducted at the Illinois Experiment Station.

In these tests three different ratios of protein supplement and corn grain were used. These ratios included lots fed 1 part of soybean meal to 2 parts of corn, 1 to 4 and 1 to 7. Results indicate that under prevailing prices of $36 per ton for soybean meal and 80 cents for corn, the 1 to 4 ratio was the most profitable instead of the normal 1 to 7 mixture.

1 to 2 Ratio

Of perhaps even greater significance, the tests revealed that the 1 to 2 ratio was also highly successful. This indicates that the amount of protein which may be fed safely is much larger than is commonly used.

The normal 1½ pounds of protein feed usually given to a steer daily can be profitably increased to as much as 2½ pounds under current Iowa prices. Hogs may be self fed soybean oilmeal and minerals with corn self fed, even though they eat more of the soybean meal than is absolutely necessary from a protein standpoint. Experiments show that 100 pounds of soybean oilmeal replaced 50 pounds of tankage plus 31 pounds of corn.

Clearance Sale on

HIGH PROTEIN MEALS

By GEOFFREY SHEPHERD and FRANCIS KUTISH

From Article in October Iowa Farm Economist

THERE really is no surplus of high protein oil meal feeds this year. From a nutritional point of view, even the very large supplies that are now in sight will not be sufficient to balance the national ration. The supplies of grain feeds will also be large, so that the high protein feeds will still amount to only 84 per cent of the proper amount to balance the ration in the United States as a whole. The corresponding figure last year was 81.

Animal Proteins

Tankage supplies will be insufficient to meet nutritional needs this year, and tankage will be high priced. The ceiling for tankage prices at wholesale in the North Central region is $71 a ton, or about $80 at the farm. Tankage available for hog feeding is expected to be sufficient to balance only about 1/6 of the corn to be fed to hogs during 1942-43. Tankage prices are expected to stay close to the ceilings during the next 12 months.

Experiments show that 10 pounds of soybean oilmeal replaces 50 pounds of tankage plus 31 pounds of corn when fed in a balanced ration. Tankage is higher in mineral content than soybeans, however. Taking all these factors into account, the value of soybean meal as a supplement for corn is about $47 per ton, with corn at 80 cents per bushel and tankage at $80 per ton. Thus soybean meal at $35.50 at the mill, or about $38.50 to $39.50 from a dealer will be a bargain.

Clearly it will pay Iowa farmers to feed ample quantities of soybean meal to their hogs this year. For most classes and weights soybean meal should not be substituted for all the tankage in the ration. This is especially true in the case of nursing sows and young pigs. Soybean meal may entirely replace tankage in the rations of fattening hogs weighing 150 pounds and over, according to livestock specialists at Iowa State College. Since soybean meal is low in minerals, farmers will need to feed more minerals when soybean meal is used to replace tankage.

TABLE 1. SUPPLIES OF OILCAKE AND MEAL, 1941-42 AND 1942-43

Data in thousands of tons

	1942-43	*1941-42*
Cottonseed meal	2,350	1,915
Soybean meal	3,700	1,825
Peanut meal	325	65
Linseed meal	850	925
Copra	25	80
Gluten feed meal	975	975
Total	8,225	5,785
Animal units	141,000	127,000
Supply in pounds per animal unit	116.7	91.0
Tankage supply per animal unit[1]	19.0	22.0
Protein supplies as a percentage of protein required	84	79

Data from Malcolm Clough, BAE, 9/17/42.

[1] Meat scraps, tankage and fish meal per animal unit of hogs and poultry.

Cattle Feeders

Beef cattle feeders may also profitably use soybean meal to balance beef cattle rations. This is particularly true in the case of short fed cattle and those of the plainer grades. Soybean oilmeal forms an excellent protein supplement for dairy cows. For the average cow milked in Iowa, 100 pounds of soybean meal will replace 10 bushels of grain. With soybean meal costing less than $2 per 100 pounds, the saving in feed costs is obvious.

All in all, it appears that protein feeds will be a bargain and supplies ample this year. It will pay you to step up the amount you feed. This will not only enable your livestock to make more rapid gains; it will also enable them to gain more economically.

REX BERESFORD

SOYBEAN AND BARLEY MEETINGS

Five Soybean and Barley meetings were held at Rochester, Mankato, Blue Earth, Lakefield and Wabasso, Minnesota during the week of October 5. The meetings were held jointly between the Northwest Crop Improvement Association and the Minnesota Extension Service. Personnel includes W. B. Combs, Agricultural Marketing Specialist, U.S.D.A.; M. L. Armour, Minnesota Extension Agronomist; S. J. Oberhauser, Agricultural Agent, The Milwaukee Road; and H. O. Putnam, Northwest Crop Improvement Association.

The purpose of the meetings was to discuss the grading and handling of soybeans and barley. Much interest was shown by an attendance of 267 including elevator managers, AAA committeemen, Commodity Loan sealers and farmers.

Many soybeans in Minnesota are immature and damaged by the early frost. Some of the crop will be unsuitable for crushing and many of the beans are standing and may be either combined when dry, or cut with a binder and allowed to properly dry in the shock.

SOYBEANS . . . . and People

SOYBREAD* ★ A Bread Enriched With Minerals and Vitamins

By J. A. LeCLERC and EMILY GREWE

Agricultural Chemical Research Division
Bureau of Agri. Chemistry and Engineering
Agricultural Research Administration
U. S. Department of Agriculture

PROBABLY no food has had, in recent years, more merited favorable publicity than soybeans and the products made therefrom. It is now being quite generally recognized that soy flour is exceptionally rich in many of the essential nutritional factors such as high-quality protein, minerals, and vitamins. All this applies equally well to the three kinds of soy flour — full-fat, medium-, and low-fat. All three types have excellent nutritive value. Soy flour is 15 times as rich in calcium as is patent wheat-flour, 7 times as rich in phosphorus, 10 times as rich in iron, 10 times as rich in thiamin, 9 times as rich in riboflavin, and 5 times as rich in niacin, (nicotinic acid) besides being 4 to 5 times as rich in protein and 10 times as rich in total minerals.

Much has been said already about enriched flour and bread. It is not intended to go into the history of this subject in detail. Suffice it is to say that England, after

J. A. LeCLERC

having considered the pros and cons of this subject for two years and more, has finally given up the whole idea of flour enrichment by use of synthetics and has gone on to an 85 percent wheat-flour extraction basis. Canada and Australia have never favored the use of chemicals to enrich flour but preferred to use some of the millstreams, found to be especially rich in the B vitamins, in addition to and in conjunction with the regular flour. Canada has even gone so far as to stigmatize as "adulterated" any flour to which a synthetic vitamin has been added.

Probably, a still better method to enrich flour is to use, with white flour or whole-wheat flour, some such product as soy flour, peanut flour, cottonseed flour, wheat germ, etc. The use of 20 percent of soy flour with 80 percent of clear flour makes a bread which is fully three-fourths as rich in thiamin as is whole wheat bread, 85 percent as rich in iron, 70 percent as rich in phosphorus and 50 percent as rich in niacin. Such a bread, made with 6 percent skim milk powder, is even richer in calcium and riboflavin than is whole wheat bread.

Normally, 100 pounds of wheat yields 72 pounds of flour. The losses which result in the milling process are significant, viz.: an average of over 80 percent of the total minerals, besides approximately an equal amount of the vitamins. Wheat contains some 15 to 20 different minerals, depending upon the presence of these elements in the soil. In the process of milling wheat to flour, 70 to 90 percent of each of these minerals is found in the offal. The enrichment program calls for the addition of one mineral only, viz., iron.

In wheat are found 10 to 12 vitamins of which, so far as our knowledge goes at present, thiamin, niacin, riboflavin, pyridoxine, pantothenic acid, and vitamin E are the most important. Many more vitamins may be discovered in, and isolated from, the wheat in the future. However, according to our present knowledge, from 50 to 95 percent of each of the known vitamins is removed in milling and is found in the feed. The enrichment program calls for the addition of two vitamins viz.: thiamin and niacin.

The use of wheat germ, soy flour, peanut flour, cottonseed flour, dried yeast, dried skim milk, etc., all rich in B vitamins as well as in minerals, would enrich white flour in a balanced manner, because each of those enriching substances would not only add thiamin, niacin, and iron to a flour deficient in most vitamins and minerals, but all of the minerals and the B vitamins in amounts and in proportions naturally found in those enriching substances.

The amount of calcium, phosphorus, and iron and of thiamin, riboflavin, and niacin, present in one-half pound of bread made from patent, clear, and whole wheat flours,

TABLE 1. PERCENTAGES OF THE DAILY REQUIREMENTS[1] OF MINERALS AND VITAMINS IN ONE-HALF POUND OF BREAD[2]

Bread made from:	*Calcium*	*Phosphorus*	*Iron*	*Vitamin B_1*	*Vitamin B_2*	*Niacin*
Plain patent flour.....	17.5	17.2	13.3	9.2	11.9	13.9
Enriched patent flour.....	17.5	17.2	16.6	27.7	11.9	16.0
Optional						
Enriched patent flour.....	35.0	17.2	16.6	27.7	24.0	16.0
Plain clear flour.....	18.6	24.2	27.1	24 5	13.3	24.9
Whole wheat flour.....	22.4	47.5	48.2	42.3	15 3	59.9
80% plain patent flour						
20% soy flour	27.7	29.0	30.9	20.0	15.4	20.4
80% plain clear flour						
20% soy flour.....	28.6	34.6	41.2	32.7	16.7	29.5
80% whole wheat flour						
20% soy flour.....	32.1	54.0	58.6	46.4	17.8	56.1

[1] National Research Council — Daily requirement: Ca, 0.8 g.; (P, 1.5 g.); Fe, 12 mg.; B_1, 1.8 mg.; B_2, 2.7 mg.; niacin, 18 mg.

[2] Bread formula: 315 g. flour, or 252 g. flour plus 63 g. soy flour. 19 g. dried skim milk. 8 g. compressed yeast. 6 g. salt. 190-220 cc. water.

TABLE 2. AMOUNT OF FOOD FACTORS IN ½ LB. OF BISCUITS (5.6 OZ. FLOUR)

Biscuits made from:	*Protein*	*Salt-free Minerals*	*Calcium*	*Phosphorus*	*Iron*	*Thiamin*	*Riboflavin*	*Niacin*
	grams	*grams*	*(Milligrams)*			*(Micrograms)*		
Plain patent flour.....	16.3	0.66	28.7	146.6	1.15	73.2	65.1	1474.5
Enriched patent flour..	16.3	0.66	28.7	146.6	2.14	586.0	65.1	2157.0
Whole wheat flour.....	18.6	3.19	78.2	673.5	5.94	776.7	184.9	10454.0
50% plain clear flour / 50% soya flour	45.7	4.44	251.1	651.2	6.73	558.0	339.4	6020.0
Daily Requirement ...	70.00		800.	1500.	12.	1800.	2700.	18000.
PERCENTAGE OF DAILY REQUIREMENT IN ½ LB. BISCUITS								
Biscuits made from:								
1) Plain patent flour...	23.3	—	3.6	9.8	9.6	4.1	2.4	8.2
2) Enriched patent flour	23.3	—	3.6	9.5	17.8	32.6	2.4	12.0
3) Whole wheat flour...	27.7	—	9.7	44.8	49.5	43.1	7.7	58.0
4) 50% plain clear flour / 50% soya flour	65.3	—	31.4	42.1	56.1	31.0	12.6	33.4
4) greater than 2) by %			800	325	229	−5	420	180

*Agricultural Chemical Research Division Contribution No. 86.

Upper photo shows appearance of wheat bread, left, and bread from 80 percent wheat flour, 20 percent soy, with different kinds of soy flour in Nos. 2 and 3. Lower photo, whole wheat bread, left, and bread with 85 percent whole wheat, 15 percent soy. Nos. 5 and 6, two kinds of soy flour.

as well as from mixtures of 20 percent soy flour with 80 percent wheat flour (all bread doughs containing 6 percent of skim milk solids) has been compared to the daily requirement of these essential food factors. According to the National Research Council, the average adult requires daily 0.8 g. of calcium, 12 mg. iron, 1.8 mg. thiamin, 2.7 mg. riboflavin, 18 mg. of niacin. Nutritionists generally assumed that approximately 1.5 g. of phosphorus is required daily per adult. On the basis that the average per capita consumption of bread is approximately one-half pound per day, that amount of bread made with 20 percent soy flour and 80 percent clear would supply 29 percent of the calcium, 35 percent of the phosphorus, 41 percent of the iron, 33 percent of the thiamin, 16 percent of the riboflavin, and 30 percent of the niacin required per day. One-half pound of bread made from a similar mixture of soy flour and whole wheat flour would supply 32 percent of the calcium, 54 percent of the phosphorus, 59 percent of the iron, 46 percent of the thiamin, 18 percent of the riboflavin, and 56 percent of the niacin of the daily requirement. In other words, bread containing 20 percent of soy flour and 80 percent of clear wheat flour would be approximately 63 percent richer in calcium than the present patent flour enriched bread, 100 percent richer in phosphorus, 150 percent richer in iron, 70 percent richer in niacin, but only 20 percent richer in thiamin and 40 percent richer in riboflavin.

In Table I are shown the percentages of the daily requirements of minerals (calcium, phosphorus, and iron) and vitamins (B_1, B_2, and niacin).

Not only can very satisfactory and nutritious bread be made from mixtures of 20 percent soy flour and 80 percent wheat flour, but, relatively speaking, equally nutritious cake, pie crust, macaroni, pretzels, biscuits, and cookies can likewise be made with such mixtures. Baking powder biscuits, e.g., made from a 50 to 50 mixture of soy flour and clear grade of wheat flour contain over five times as much minerals, including calcium and iron, five times as much thiamin and riboflavin, four times as much phosphorus, and three times as much niacin, as do biscuits made from plain white flour only.

The consumption of soy flour-clear flour bread would supply each year 1½ lbs. more minerals than would the ordinary enriched bread, besides 1¼ ounces of calcium, 3½ ounces phosphorus, 1.2 g. iron, 48 mg. thiamin, 54 mg. riboflavin, and 972 mg. of niacin. These are appreciable quantities when it is considered that the daily requirement of thiamin is only 1.8 mg., that of riboflavin, 2.7 mg., and that of niacin, 18 mg. These figures become all the more significant if applied to the 16 to 18 years of the growing period of a child, for, during this period most children eat no bread except white bread.

If You Have Poultry or Livestock

and

If You Are a Soybean Grower

Then you should be feeding Purina Chows. These feeds are supplements to your grain and they are made to do a more profitable job of producing pork, eggs, or milk than straight grain will do. And they use soybean meal as a major source of protein. In fact, Purina Mills is the largest user of soybean oilmeal in the country. Use the feeds that utilize the beans you grow! . . . . . **Purina Mills, St. Louis, Mo.**

SOYBEANS . . . . and People

SOYBREAD* ★ A Bread Enriched With Minerals and Vitamins

By J. A. LeCLERC and EMILY GREWE

Agricultural Chemical Research Division
Bureau of Agri. Chemistry and Engineering
Agricultural Research Administration
U. S. Department of Agriculture

PROBABLY no food has had, in recent years, more merited favorable publicity than soybeans and the products made therefrom. It is now being quite generally recognized that soy flour is exceptionally rich in many of the essential nutritional factors such as high-quality protein, minerals, and vitamins. All this applies equally well to the three kinds of soy flour — full-fat, medium-, and low-fat. All three types have excellent nutritive value. Soy flour is 15 times as rich in calcium as is patent wheat-flour, 7 times as rich in phosphorus, 10 times as rich in iron, 10 times as rich in thiamin, 9 times as rich in riboflavin, and 5 times as rich in niacin, (nicotinic acid) besides being 4 to 5 times as rich in protein and 10 times as rich in total minerals.

Much has been said already about enriched flour and bread. It is not intended to go into the history of this subject in detail. Suffice it is to say that England, after

J. A. LeCLERC

having considered the pros and cons of this subject for two years and more, has finally given up the whole idea of flour enrichment by use of synthetics and has gone on to an 85 percent wheat-flour extraction basis. Canada and Australia have never favored the use of chemicals to enrich flour but preferred to use some of the millstreams, found to be especially rich in the B vitamins, in addition to and in conjunction with the regular flour. Canada has even gone so far as to stigmatize as "adulterated" any flour to which a synthetic vitamin has been added.

Probably, a still better method to enrich flour is to use, with white flour or whole-wheat flour, some such product as soy flour, peanut flour, cottonseed flour, wheat germ, etc. The use of 20 percent of soy flour with 80 percent of clear flour makes a bread which is fully three-fourths as rich in thiamin as is whole wheat bread, 85 percent as rich in iron, 70 percent as rich in phosphorus and 50 percent as rich in niacin. Such a bread, made with 6 percent skim milk powder, is even richer in calcium and riboflavin than is whole wheat bread.

Normally, 100 pounds of wheat yields 72 pounds of flour. The losses which result in the milling process are significant, viz.: an average of over 80 percent of the total minerals, besides approximately an equal amount of the vitamins. Wheat contains some 15 to 20 different minerals, depending upon the presence of these elements in the soil. In the process of milling wheat to flour, 70 to 90 percent of each of these minerals is found in the offal. The enrichment program calls for the addition of one mineral only, viz., iron.

In wheat are found 10 to 12 vitamins of which, so far as our knowledge goes at present, thiamin, niacin, riboflavin, pyridoxine, pantothenic acid, and vitamin E are the most important. Many more vitamins may be discovered in, and isolated from, the wheat in the future. However, according to our present knowledge, from 50 to 95 percent of each of the known vitamins is removed in milling and is found in the feed. The enrichment program calls for the addition of two vitamins viz.: thiamin and niacin.

The use of wheat germ, soy flour, peanut flour, cottonseed flour, dried yeast, dried skim milk, etc., all rich in B vitamins as well as in minerals, would enrich white flour in a balanced manner, because each of those enriching substances would not only add thiamin, niacin, and iron to a flour deficient in most vitamins and minerals, but all of the minerals and the B vitamins in amounts and in proportions naturally found in those enriching substances.

The amount of calcium, phosphorus, and iron and of thiamin, riboflavin, and niacin, present in one-half pound of bread made from patent, clear, and whole wheat flours,

TABLE 1. PERCENTAGES OF THE DAILY REQUIREMENTS[1] OF MINERALS AND VITAMINS IN ONE-HALF POUND OF BREAD[2]

Bread made from:	*Calcium*	*Phosphorus*	*Iron*	*Vitamin B_1*	*Vitamin B_2*	*Niacin*
Plain patent flour.....	17.5	17.2	13.3	9.2	11.9	13.9
Enriched patent flour.....	17.5	17.2	16.6	27.7	11.9	16.0
Optional						
Enriched patent flour.....	35.0	17.2	16.6	27.7	24.0	16.0
Plain clear flour.....	18.6	24.2	27.1	24 5	13.3	24.9
Whole wheat flour.....	22.4	47.5	48.2	42.3	15 3	59.9
80% plain patent flour						
20% soy flour	27.7	29.0	30.9	20.0	15.4	20.4
80% plain clear flour						
20% soy flour.....	28.6	34.6	41.2	32.7	16.7	29.5
80% whole wheat flour						
20% soy flour.....	32.1	54.0	58.6	46.4	17.8	56.1

[1] National Research Council — Daily requirement: Ca, 0.8 g.; (P, 1.5 g.); Fe, 12 mg.; B_1, 1.8 mg.; B_2, 2.7 mg.; niacin, 18 mg.

[2] Bread formula: 315 g. flour, or 252 g. flour plus 63 g. soy flour. 19 g. dried skim milk. 8 g. compressed yeast. 6 g. salt. 190-220 cc. water.

TABLE 2. AMOUNT OF FOOD FACTORS IN ½ LB. OF BISCUITS (5.6 OZ. FLOUR)

Biscuits made from:	*Protein*	*Salt-free Minerals*	*Calcium*	*Phosphorus*	*Iron*	*Thiamin*	*Riboflavin*	*Niacin*
	grams	*grams*	*(Milligrams)*			*(Micrograms)*		
Plain patent flour.....	16.3	0.66	28.7	146.6	1.15	73.2	65.1	1474.5
Enriched patent flour..	16.3	0.66	28.7	146.6	2.14	586.0	65.1	2157.0
Whole wheat flour.....	18.6	3.19	78.2	673.5	5.94	776.7	184.9	10454.0
50% plain clear flour / 50% soya flour	45.7	4.44	251.1	651.2	6.73	558.0	339.4	6020.0
Daily Requirement ...	70.00		800.	1500.	12.	1800.	2700.	18000.
PERCENTAGE OF DAILY REQUIREMENT IN ½ LB. BISCUITS								
Biscuits made from:								
1) Plain patent flour...	23.3	—	3.6	9.8	9.6	4.1	2.4	8.2
2) Enriched patent flour	23.3	—	3.6	9.8	17.8	32.6	2.4	12.0
3) Whole wheat flour...	27.7	—	9.7	44.8	49.5	43.1	7.7	58.0
4) 50% plain clear flour / 50% soya flour	65.3	—	31.4	42.1	56.1	31.0	12.6	33.4
4) greater than 2) by %			800	325	229	—5	420	180

*Agricultural Chemical Research Division Contribution No. 86.

Upper photo shows appearance of wheat bread, left, and bread from 80 percent wheat flour, 20 percent soy, with different kinds of soy flour in Nos. 2 and 3. Lower photo, whole wheat bread, left, and bread with 85 percent whole wheat, 15 percent soy. Nos. 5 and 6, two kinds of soy flour.

as well as from mixtures of 20 percent soy flour with 80 percent wheat flour (all bread doughs containing 6 percent of skim milk solids) has been compared to the daily requirement of these essential food factors. According to the National Research Council, the average adult requires daily 0.8 g. of calcium, 12 mg. iron, 1.8 mg. thiamin, 2.7 mg. riboflavin, 18 mg. of niacin. Nutritionists generally assumed that approximately 1.5 g. of phosphorus is required daily per adult. On the basis that the average per capita consumption of bread is approximately one-half pound per day, that amount of bread made with 20 percent soy flour and 80 percent clear would supply 29 percent of the calcium, 35 percent of the phosphorus, 41 percent of the iron, 33 percent of the thiamin, 16 percent of the riboflavin, and 30 percent of the niacin required per day. One-half pound of bread made from a similar mixture of soy flour and whole wheat flour would supply 32 percent of the calcium, 54 percent of the phosphorus, 59 percent of the iron, 46 percent of the thiamin, 18 percent of the riboflavin, and 56 percent of the niacin of the daily requirement. In other words, bread containing 20 percent of soy flour and 80 percent of clear wheat flour would be approximately 63 percent richer in calcium than the present patent flour enriched bread, 100 percent richer in phosphorus, 150 percent richer in iron, 70 percent richer in niacin, but only 20 percent richer in thiamin and 40 percent richer in riboflavin.

In Table I are shown the percentages of the daily requirements of minerals (calcium, phosphorus, and iron) and vitamins (B_1, B_2, and niacin).

Not only can very satisfactory and nutritious bread be made from mixtures of 20 percent soy flour and 80 percent wheat flour, but, relatively speaking, equally nutritious cake, pie crust, macaroni, pretzels, biscuits, and cookies can likewise be made with such mixtures. Baking powder biscuits, e.g., made from a 50 to 50 mixture of soy flour and clear grade of wheat flour contain over five times as much minerals, including calcium and iron, five times as much thiamin and riboflavin, four times as much phosphorus, and three times as much niacin, as do biscuits made from plain white flour only.

The consumption of soy flour-clear flour bread would supply each year 1½ lbs. more minerals than would the ordinary enriched bread, besides 1¼ ounces of calcium, 3½ ounces phosphorus, 1.2 g. iron, 48 mg. thiamin, 54 mg. riboflavin, and 972 mg. of niacin. These are appreciable quantities when it is considered that the daily requirement of thiamin is only 1.8 mg., that of riboflavin, 2.7 mg., and that of niacin, 18 mg. These figures become all the more significant if applied to the 16 to 18 years of the growing period of a child, for, during this period most children eat no bread except white bread.

If You Have Poultry or Livestock

and

If You Are a Soybean Grower

Then you should be feeding Purina Chows. These feeds are supplements to your grain and they are made to do a more profitable job of producing pork, eggs, or milk than straight grain will do. And they use soybean meal as a major source of protein. In fact, Purina Mills is the largest user of soybean oilmeal in the country. Use the feeds that utilize the beans you grow! . . . . **Purina Mills, St. Louis, Mo.**

November Crop Report

(Continued from page 2)

in 7 or 8 counties northwestern Ohio. Spotted, not serious. Less than 1 percent sample grade. Yield 10 to 20 percent above normal. Elevators and processors filled. No rail or truck movement at present. Most beans held temporarily on farm. Farmers appreciate support price, complain about movement. More terminal storage needed. Except for labor conditions farmers can or will increase in 1943. Ohio will have available acreage for increase in soybeans if requested. More educational work needed along line of varieties, planting and cultivation.

W. G. Weigle, Marsh Foundation Farms, Van Wert, for northwest: 45 percent of crop harvested by Nov. 1. 10 percent damage by frost. Yield 7 or 8 percent above normal. CCC storage provisions inadequate. Farmers will have to hunt up storage space they did not know they had. High yield and good price will encourage big increase in 1943, unless storage difficulties discourage. How will all these beans ever be processed before 1943 crop harvested? Farmers need education as to soybean oil meal value.

WISCONSIN

Geo. Briggs, extension agronomist, Madison: 50-60 percent crop harvested Nov. 1. 60-80 percent frost damage. 80 percent sample grade beans. Yield 50 percent earlier estimates. 60-70 percent harvested for beans. Storage situation of concern in high tenant counties in southeast section. Farmers not feeding soybean oil meal freely, as a question of price in relation to other high protein feeds.

John P. Dries, Saukville, for southeastern Wisconsin lake shore: 80 percent harvested by Nov. 1, 20 percent damage by frost. Yield 20-25 bu., with 100 percent harvested for beans. Storage no problem. Farmers rather discouraged toward 1943 production because of early freeze. My own field new selection Wisconsin Manchu No. 3 yielded 26 bu. seed on cleaned basis. Seem to ripen earlier than old Wis. No. 3 Manchu. Very fine quality seed.

Walter F. Katterhenry, Agricultural Conservation Committee, Madison: 45 percent crop harvested Nov. 1, 90 percent frost damage in north and central part, which grows only 10 percent state's total. Damage to individual crops from 10 to 100 percent. In southeast and southwest parts, 50-70 percent frost damage, with damage to individual crops from 20 to 60 percent. 70 percent sample grade beans. Yield 2 bu. lower than October estimate. More beans than normal being stored on farms. Very few stored off farm. Because of provisions for buying frost damaged beans farmers feel government is definitely helping them out of bad situation. Can be induced to plant large acreage in 1943 if price stabilization program followed and appeal made on basis of patriotism. Farmers do not feed oil meal freely at present prices. Feeding soybean oil meal emphasized in recent series of meetings of feed dealers. Triple-A pushing use of more bean meal through all available information channels.

MINNESOTA

N. C. Beiter, Farmer Seed & Nursery Co., Faribault, for central and southern: About 75 percent crop harvested by Nov. 1. 25 percent no damage, 25 percent slight damage, 25 percent half green, 25 percent all green. Perhaps 75 percent harvested for beans. 50 percent stored on farms. Farmers not satisfied with big discounts on green beans. No doubt some who lost crop by frost will not plant next year.

Minnesota Crop Reporter: Reported yield of beans as of Oct. 1 placed at 12 bu. and indicated production at 3,792,000.

ARKANSAS

Charles F. Simmons, extension agronomist, Little Rock: 75-80 percent beans combined by Nov. 1. Ideal weather conditions for harvest. Sufficient combines in state, but short in some areas, and lack of experience led to inefficient use of combines. Frost damage local, negligible for state. 95 percent of beans in Little Rock running No. 2 or better. Believe yields will average 15-18 bu. per acre, as compared with 12 bu., last yield reported by Crop Reporting Service. Farm storage extremely limited. Buyers taking beans about as fast as offered, though buyers in Little Rock saturated this week. Government marketing program working out very satisfactorily. At present prices and yields farmers will likely increase 1943 soybean acreages. Supply of seed beans limited acreage some in 1942. Labor questionable factor in 1943. Soybeans not crushed in this area, so farmers not using soybean meal to any extent.

Jacob Hartz, Stuttgart, for eastern one-half: 65 to 70 percent harvested Nov. 1. No frost damage, 90 percent No. 2. Yield 20-25 percent above normal, sharply above earlier estimates. Storage situation not so good. Many farmers buying AAA bins. Feel ok toward program after CCC authorized $1.60 price for Arkansas high oil content beans. Are favorable toward 1943 production if government keeps price at same figure. Farmers not feeding bean meal yet, because mills have not started crushing, with large cottonseed crop to process first. Adequate educational work not being done.

KENTUCKY

J. E. McClure, county agent, Daviess County: 90 percent crop harvested by Nov. 1. Frost damage very slight, mainly to late variety, Ogden, and very late seeded plots. Yield 140 percent above earlier estimates. Local mill rationing deliveries to about 45 loads daily. Growers must hold beans until their delivery time. Home storage loans being made on a very few lots. Farmers much dissatisfied at not being able to make prompt delivery. Almost none prepared to properly store beans at home. Rumors of lowered acreage 1943. Big opportunity for educational work on soybean meal due to tankage shortage.

Ralph Kenney, extension agronomist, Lexington: 80 percent crop harvested Nov. 1. Slight frost damage except to crop planted on small grain stubble and very late varieties. Yield above normal, 60 percent harvested for beans. Storage very congested, some beans on tobacco warehouse floors, others temporarily on farms. Farmers greatly dissatisfied on account of congested market. Will not grow as many beans in 1943 unless marketing and storage situation improved.

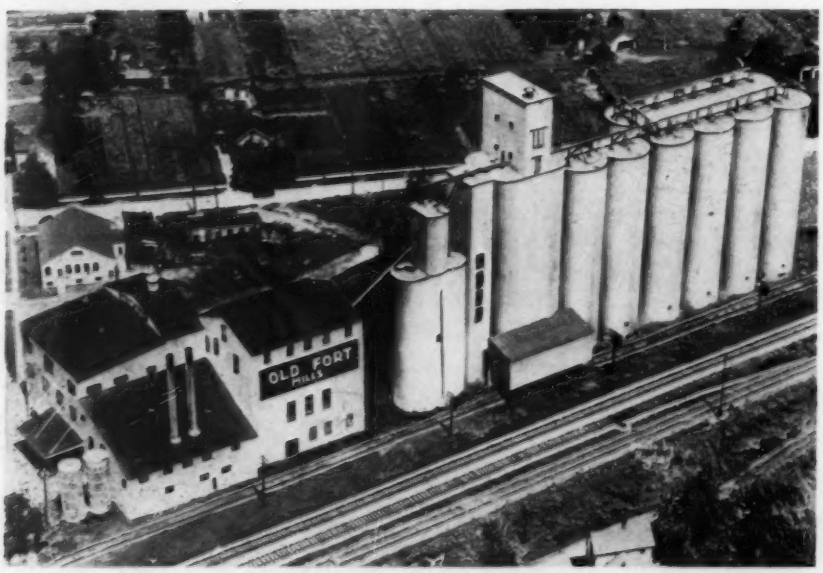
NEW YORK

F. P. Russell, Dept. Plant Breeding, Cornell University, Ithaca: Not over 20 percent harvested Nov. 1. No damage by frost, with most of crop probably grading No 2. Probably one-third of total will be harvested for beans. Storage problem should give no trouble, though beans have hardened very slowly and harvesting delayed at least 2 weeks because of non-drying weather. Farmers feeding bean meal freely considering price asked. Lower price linseed meal chief limiting factor.

MISSISSIPPI

D. L. Edson, District Agent of Extension, Greenwood, for Delta Area: Crop 85 percent of normal. 90 percent grade No. 1 and 2. Storage situation working out satisfactorily, with compresses handling 85 percent of beans. Farmers are confused by marketing program. Will not plant so many beans in 1943 unless convinced of necessity for war purposes.

ACQUIRED BY McMILLEN



Aerial view of Old Fort Mills, Marion, Ohio, controlling interest in which was recently acquired by Dale W. McMillen, of Fort Wayne, Ind. Mr. McMillen is president of the Central Soya Company.

Old Fort Mills is a soybean processing plant, with six expellers and a crushing capacity of about 100,000 bushels per month. It is also equipped for the manufacture of commercial livestock feeds.

KANSAS

E. A. Cleavinger, extension specialist, Manhattan: 85 percent harvested Nov. 1. 10 percent frost damage in southeast and south central; 20 percent in northeast and north central. 90 percent will grade No. 2 or better. Yield 140 percent normal. Serious transportation and storage problem. Farmers' attitude toward 1943 soybean production adverse due to storage problems.

Kansas Weekly Crop Report: Harvest progressing nicely in eastern counties and yields reported fair to good. Damage by September frost not as severe as earlier expected. Most of damage confined to northeastern area, where beans seeded late.

NEBRASKA

Abner K. Chestum, State AAA Committee, Lincoln: 95 percent harvested Nov. 1. 95 percent suffered 15 percent frost damage. 55 percent sample grade. Yield 105 percent normal. Storage being handled quite satisfactorily by AAA. Soybean production will increase in 1943. Farmers would feed bean meal if it could be obtained. Processors not selling to farmers. Condition unsatisfactory.

PENNSYLVANIA

L. H. Wiland, Agricultural Statistician, Harrisburg: Many soybeans not harvested on account of wet weather and some undoubtedly will be lost. Insufficient combines to handle greatly increased acreage. Yield 10 percent above average. Bulk of crop will have to be stored on farms temporarily. Farmers complaining no market readily available. Inadequate educational work on bean meal being done.

—s b d—

SOYBEAN PRODUCTS IN FOOD MANUFACTURE

(Continued from page 5)

content to the one that did not contain soya — but much more total food value will be consumed for every pound of merchandise *originally* purchased, as the yield per pound of finished food is greater.

It is of interest to see what this means from the standpoint of shipping space — utilization of cans, and more food for the American people. First, the average pork sausage that one would consume in his home would, on the basis of the edible portion consumed, cost from 70c to 80c per pound. With just a small amount of soya, as mentioned, the edible portion would cost from 50c to 65c per pound.

In every one million pounds of canned pork sausage — either in the bulk or link form — there is only about 600,000 pounds of edible portion. By the addition of 10% soya, an additional 150,000 pounds of edible portion is made available.

Soya Quality

As to the quality of the finished pork sausage containing soya, in a recent test, 9 out of 15 preferred the product containing soya. From this we can assume that the pork and soya sausage is at least as good as the product which does not contain soya.

The next use for soya that I would like to discuss *was* its use in canned dog food. One may wonder what dog food, or animal food, has to do with human food — but it so happens that when canned dog foods were first put on the market they were labelled as being fit for human consumption, as they were produced from edible products. Later on this was changed, by governmental ruling, but in most cases the formulae as used by various manufacturers of canned dog foods in federal inspected plants, were not changed.

The manufacturers of canned dog food fortunately were more interested in taking care of the animals "physiological" hunger than the "psychological" hunger and, therefore, the use of soya was instantaneous and increased steadily in such products.

Peculiarly, it was in this industry that a great deal was learned about the absorption of soya products and their action during canning. Many manufacturers, because of some of the other ingredients used, desired soya which had lower moisture and fat absorption. Some wanted products having higher moisture and fat absorbing qualities. Some wanted a solid packed product and others wanted a product that would crumble when it was opened. From this work other types of soya products began to develop — such as fine grits, coarse grits, fine flakes and large flakes. We began to learn that in certain cases particle size had a great deal to do with the final appearance and texture of the finished product. We were rapidly getting a complete line of soya products.

At present soya is being used in macaroni and other products of this type. Sales of such soya foods are small — although the product can be considered a good food, from both the nutritional standpoint and its physical properties. If ever soya belonged in a food product, macaroni or spaghetti is that food.

These products are consumed as main dishes and the total protein consumed is relatively little. 12.5% of soya added to such products will aid in producing a complete protein, and would increase the total protein intake per dish from 35-40%, or as much as 5.5 grams per meal.

We have also found that in all types of cereals — which were to be cooked, such as farina, oatmeal, whole wheat cereal, corn meal, hominy, etc. — that percentages of from 10 to 20% of the proper type of soya added desirable amounts of protein, and supplemented the proteins which in many cases were, by themselves, incomplete. In the case of a farina, for example — the addition of 20% of soya increased the protein content of the finished cereal from approximately 14% to 21%.

Soups, such as are termed concentrated soups, and are purchased by Lend-Lease — contain moderate quantities of soybean products. The interesting thing is that organizations who have packed such products for Lend-Lease have begun to experiment with the use of soya products in soups for domestic uses. They have found that moderate percentages help produce a soup that has desirable body and, of course, increases the nutritional value of such a product. When one consumed a bowl of such a soup, they had a sensation of fullness and felt that the soup was a nourishing one. In using soya in soups, it is important that when acidic types of soup are made — such as tomato — that this acidity be controlled, as the protein of the soybean will coagulate and curdle just as milk does.

From our experience, and our present knowledge of the soybean, and products which we have made from them — I believe that the industry today is in a position to say — "Show us the food and, if soya should be used in it, we will show you the proper soya product to be used in its manufacture, and the proper way to use it."

RATS..

RATS..

EVERYWHERE

Use . . .

RAT RUIN

Non-poisonous to humans or pets

Why allow rats to destroy poultry and foodstuffs? RAT-RUIN, a red squill product made according to U. S. Department of Agriculture formulas, will eliminate 90% of that loss.

TRIAL BOX... **$1.00**

Enough to Kill 200 Rats **Postpaid**

Also packed in bushel, half bushel, and one-fourth bushel baskets for quantity users. Write for prices.

Address Orders and Inquiries to

Dept. FH—The Soybean Digest—Hudson, Iowa

NO MUSS--- READY TO USE

WOODSON-TENENT LABORATORIES

MEMPHIS, TENNESSEE and CAIRO, ILLINOIS

Analysis of Soybeans and Products

Official Chemists for National Soybean Processors Association

BEFORE SELLING, PLEASE CONSULT

STERNE & SON CO.

"JUST BROKERS"

Oldest Handlers of Soyabean Oil

Direct to All Refiners

Board of Trade Building
CHICAGO, ILLINOIS

Telephone:
HARRISON 4797

EXTRA STORAGE FOR WAR NEEDS

To help you do an even bigger grain handling job, extra storage space is needed . . . and that's where Neff & Fry can help you.

Neff & Fry storage bins can be erected in a hurry . . . yet their steel and concrete stave construction provides amazing strength and complete weather protection.

Available in any size or capacity. Control housings on top or on the ground level.

Let us refer you to Neff & Fry elevator installations near you.

Also Concrete Monolithic Bins

THE NEFF & FRY CO.
CAMDEN, OHIO

NEFF & FRY SILOS

MARKET SUMMARY

SOYBEANS

	Nov. 7	Oct. 24	Oct. 9
December	1.65	1.60¾	1.62½
May	1.67½A	1.64½	

SOYBEAN OIL

	Nov. 7	Oct. 24	Oct. 3
Tanks, Midwest Mills	11¾	11¾	11¾

SOYBEAN MEAL

	Nov. 6	Oct. 26	Oct. 8
October		42.50 B	36.25 B
December	39.00 @ 39.50	38.00 @ 38.50	33.75 B
May	36.50 @ 38.00		

With storage facilities for beans mostly filled, movement of beans was limited by permit to processors' daily capacity and futures market largely inactive. The meal market shows increasing strength with big demand for small amount offered. Most large processors are far behind in their orders and will be out of the market for some time. With old crop oil cleaned up, the price remained at the ceiling during the month.

STANDARD SHORTENING SHIPMENTS

By Members of Institute of Shortening Mfgs., Inc.

Week ending Oct. 3	19,671,616
Week ending Oct. 10	16,444,187
Week ending Oct. 17	11,840,901
Week ending Oct. 24	9,809,500
Week ending Oct. 31	10,311,667

NEWS OF THE TRADE

SOYBEAN INSPECTIONS

A total of 285 car lots of soybeans were inspected under the Grain Standards Act at markets in states where licensed grain inspectors are located during the period Sept. 16-30. Included were: Illinois 177, Indiana 44, Iowa 14, Missouri 8, and Ohio 42.

Receipts for October 1-15 totaled 5,435 cars, as follows: Illinois 3,752; Indiana, 702; Iowa, 370; Missouri, 75; and Ohio, 536.

September inspections of soybeans totaling 538 cars brought the 1941-42 total to 45,152 cars, according to inspectors' reports to the Agricultural Marketing Administration. This compares with 33,280 cars inspected in 1940-41.

Of the September inspections 60 percent graded No. 3 or better compared with 64 percent in these grades in August. For the entire season about 81 percent of the soybeans inspected graded No. 3 or better. Comparable data are not available for the 1940-41 season because of a change in grade specifications.

SOYBEANS: INSPECTED RECEIPTS, SEPTEMBER 1942, IN CARLOTS*

CLASS	GRADE No. 1	No. 2	No. 3	No. 4	Sample	Total Sept. 1942	Total Oct. 1, 1941 to Sept. 30, 1942
Yellow	33	154	91	25	175	478	43,995
Green	—	—	—	—	—	—	17
Brown	—	—	1	—	2	3	92
Black	26	7	5	2	—	40	580
Mixed	1	7	1	3	5	17	468
Total cars	60	168	98	30	182	538	
Percentages	11	31	18	6	34	100	
Total—Oct. 1, 1941 to Sept. 30, 1942	3159	12423	21007	5745	2818		45,152

*Cargo and truck receipts converted into carloads on basis of 1,500 bushels equal 1 car.

—s b d—

PATENTS

Process for Hydrogenating Soybean Oil. Arne Gudheim (Lever Bros. Co.). U. S. 2,293,729. A method of stabilizing soybean oil against reversion under deep frying conditions utilizing temp. in the nature of 375° F. comprises hardening the oil and reducing the iodine value to at least 75 by passing H through the oil mass in the presence of a Ni catalyst while maintaining the oil at a temp. of less than 110° C.

—s b d—

SOYBEAN STOCKS

Stocks of soybeans in commercial storage as of October 27 totaled 1,349,360 bushels, reports the Agricultural Marketing Administration.

Stocks of soybeans in commercial storage as of Nov. 3 were 1,612,424 bushels, according to the commercial grain stocks report of the Agricultural Marketing Administration.

—s b d—

OILSTOCKS

Factory and warehouse stocks of crude soybean oil were 52,456,000 lbs., of refined soybean oil 55,134,000 lbs., Sept. 30, according to report of the Bureau of Census. This compares with 68,896,000 lbs. and 67,762,000 lbs. respectively for Aug. 31. The census bureau reports factory production of crude and refined soybean oil during September as 55,389,000 lbs. and 60,879,000 lbs. August production was 57,413,000 lbs. and 62,407,000 lbs. September consumption of crude soybean oil was 67,749,000 lbs., of refined 63,940,000 lbs. August consumption 68,879,000, and 58,476,000 lbs.

—s b d—

OILS GIVEN RATING

The new priorities schedule of tank car uses issued by WPB gives OTD a specific mandate to provide preferential treatment for fats and oils in the allocation of tank cars, reports L. J. Norton, chief of agricultural marketing, College of Agriculture, Urbana, Ill.

Discussing the car allocation problem as it affected vegetable fats and oils, ODT officials expressed the belief that the volume of these products to be moved during the October-November peak period would be 25 per cent heavier than during the same period last year. With approximately 6,000 tank cars reported in service carrying such war essentials as cottonseed, linseed and peanut oils, lard, tallow and grease, ODT officials estimated that 8,000 would be required for the fall peak.

Important in any period, fats and oils are "musts" in the production of such war items as paints and varnish, lubricants and greases, antirust and anti-corrosive compounds, plasticizers for the manufacture of bullet-proof glass and many other products which the War and Navy departments require today in great quantities. Of even greater importance in time of war than in peace is their use in production of soaps and such edible items as shortenings.

—s b d—

SOYBEANS IN LEND-LEASE

Purchased by Agricultural Marketing Administration for lend-lease.

Commodity	Quantity in Pounds		F.O.B. Cost	
Fats & Oils	**September**	**Cumulative**	**September**	**Cumulative**
Lard	13,577,747	840,729,689	$1,807,775	$102,323,632
Linseed Oil, Inedible	—	77,328	—	11,519
Oleo Oil	—	7,130,900	—	883,616
Oleomargarine	21,185,850	60,287,650	3,155,110	9,017,798
Rendered Pork Fat	265,000	5,596,750	34,184	715,844
Salad Oil, Edible	1,071,170	108,904,181	180,005	13,598,490
Shortening	—	9,249,865	—	1,518,847
Tallow, Edible	2,314,121	16,007,221	250,408	1,801,911
			$5,427,482	$129,871,657
Soya & Soya Products				
Soya Bean Pellets	—	9,956,000	—	259,853
Soya Beans	—	32,980,000	—	$ 1,035,079
Soya Flour	—	29,535,000	—	1,913,900
Soya Grits	—	6,840,000	—	293,120
Soya Sauce	—	312	—	1,702
				$ 3,243,801

SOY FOOD BOOKLET

SOYBEAN FOOD, a new booklet just off the press, is a reprint from The Soybean Digest, of papers on soy foods given by speakers before the 22nd annual convention of the American Soybean Association at Purdue University in September. It contains 32 pages, illustrated. Those who would like to have all this valuable information under one cover should write to any of the various manufacturers of soy flour. Or copies may be obtained from the Digest office at a cost of 10 cents each.

—s b d—

SOYBEAN FARM STOCKS

Soybean stocks still on farms in the 10 principal soybean states as of October 1, were 3,050,000 bushels, or 3 percent of the 1941 production, according to figures released by the Bureau of Agricultural Economics.

The farm stocks for individual states were as follows: Ohio, 591,000; Indiana, 873,000; Illinois, 737,000; Michigan, 27,000; Minnesota, 48,000; Iowa, 581,000; Missouri, 118,000; North Carolina, 34,000; Mississippi, 15,000; Arkansas, 35,000.

Sole Manufacturers
Patented

NU-SEME
BURLAP AND COTTON BAGS

The best substitute for new bags.

Also good quality second-hand bags.

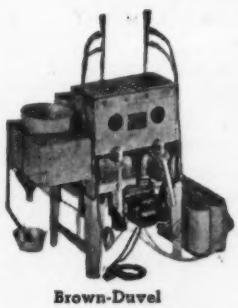
ALWAYS
a good source of supply for bags.

During the war and After the war

QUALITY AND SERVICE

WESTERN BURLAP BAG CO., Inc.
1109-21 West 38th St. CHICAGO, ILL.

HEADQUARTERS FOR MOISTURE TESTING EQUIPMENT



Brown-Duvel

For over 30 years we have been the largest distributors of grain testing equipment. We carry all of the standard makes of moisture testers including the Steinlite, Brown-Duvel and Tag-Heppenstall. Send for our 1942 catalog. Do not wait any longer. Place your order now.

TRIERS. SOYBEAN SIEVES. DOCKAGE SCALES. BOERNER SAMPLERS. GERMINATORS SAMPLE PANS.

SEEDBURO EQUIPMENT COMPANY
(Seed Trade Reporting Bureau)
629 Brooks Bldg. CHICAGO, ILL.

Steinlite

— Photo by U. S. Army Signal Corps

Cooperation —

They Know Its Meaning

AMERICAN flyers zooming out of the dark night to drop their deadly eggs on Hitler's factories, our gallant marines storming Jap bastions in Pacific islands, or the boys on our merchant men stalking hidden death in the seven seas, their ship holds full of precious life-giving cargoes bound for our allies, know the full meaning of cooperation. Cooperation spells the difference between life and death, freedom and slavery.

Cooperation is also vital to us in the soybean industry. Cooperation has already carried us far on the long road to victory since the day our government asked us to grow a cool 9 million acres of soybeans in 1942. Cooperation enabled us to answer with 10 million acres.

Cooperation will take us through the most perplexing problems we have ever faced — the problem of green beans . . . of storage . . . of transportation over roads groaning under the burden of war goods . . . of processing by mills asked to double and redouble their efforts 24 hours each day, 365 days each year . . . all to the end that every precious golden drop of oil may be saved for the war effort, that every pound of oil meal may be available as soon as possible in the farm feed lot in this furious battle for freedom.

Our Cooperation Means Much to Our Workers, Our Armies and Our Allies

ARCHER-DANIELS-MIDLAND COMPANY
Chicago, Ill. — Toledo, Ohio — Buffalo, N. Y.
Milwaukee, Wisc. — Minneapolis, Minn.

SOY BEAN PROCESSING COMPANY
Waterloo, Iowa

I. F. LAUCKS, Inc.
Portsmouth, Va.

ROSE CITY COTTON OIL MILL
Little Rock, Ark.

CAIRO MEAL and CAKE COMPANY
Cairo, Ill.

DECATUR SOY PRODUCTS COMPANY
Decatur, Ill.

CLINTON COMPANY
Clinton, Iowa

A. E. STALEY MFG. COMPANY
Decatur, Ill. — Painesville, Ohio

ILLINOIS SOY PRODUCTS CO.
Springfield, Ill.

SIMONSEN SOYBEAN MILL
Quimby, Iowa

STANDARD SOY BEAN MILLS
Centerville, Iowa

SPENCER KELLOGG AND SONS, INC.
Buffalo, N. Y. — Des Moines, Iowa
Decatur, Ill. — Chicago, Ill.

FUNK BROS. SEED CO.
Bloomington, Ill.

SOYA PROCESSING CO.
Wooster, Ohio

DANNEN GRAIN and MILLING COMPANY
St. Joseph, Mo.

SWIFT & COMPANY SOYBEAN MILLS

HOOSIER SOYBEAN MILLS, Inc.
Marion, Ind.

THE GLIDDEN COMPANY
Chicago, Ill.

IOWA MILLING COMPANY
Cedar Rapids, Iowa

QUINCY SOYBEAN PRODUCTS COMPANY
Quincy, Ill.

GALESBURG SOY PRODUCTS COMPANY
Galesburg, Ill.

ELEVATORS & MILLS, Inc.
Windfall, Ind.

ALLIED MILLS, Inc.
Chicago, Ill. — Omaha, Neb. — Peoria, Ill.
Taylorville, Ill. — Portsmouth, Va.
Fort Wayne, Ind.

BALDWIN ELEVATOR COMPANY
Decatur, Ill.

J. ROACH SONS, Inc.
Plainfield, Iowa

STOCKDALE & MAACK CO.
Estherville, Iowa

OWENSBORO GRAIN COMPANY
Owensboro, Ky.

FEDERAL-NORTH IOWA GRAIN CO.
Cedar Rapids, Iowa

LOWELL HOIT & CO.
Chicago, Ill.

THE NICKEL PLATE RAILROAD
Cleveland, Ohio